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International Safeguards

An important milestone was recently achieved related to the application of international safeguards at uranium enrichment facilities. The International Atomic Energy Agency (IAEA) accepted the procedures and software developed to enable IAEA to conduct effective inspections at the gaseous diffusion uranium enrichment facilities in Pilcaniyeu, Argentina. This was an important milestone because the facility at Pilcaniyeu was the first enrichment plant using gaseous diffusion technology to be placed under IAEA safeguards.

For the last decade, Oak Ridge International Safeguards staff members have been working with technical experts in Argentina to develop measurement methods to quantify the residual uranium within the shut-down process cascade and to develop inspection methods that the IAEA could implement to verify Argentina's official declarations. This work was conducted jointly under the terms of a Safeguards Cooperation Agreement between the U.S. Department of Energy (DOE) and the Argentine Nuclear Regulatory Authority (ARN). After a series of demonstration and validation tests, the measurement approach was accepted by the IAEA in late 1997.

Following acceptance of the measurement approach, however, the IAEA requested additional software, documentation, and training that would enable the agency to implement the approach effectively. This work was sponsored by the U.S. Program for Technical Assistance to IAEA Safeguards. The software developed (Inventory Verification Analysis Software for Pilcaniyeu or IVASP) and users' manuals were supplied to the IAEA in the fall of 2000.

During November 13–17, 2000, final acceptance testing of the software and training of the IAEA inspectors were conducted at the enrichment facilities in Pilcaniyeu. The course was conducted by Bert Rollen and Steve Smith of CITR and by Richard Mayer of U.S. Enrichment Corporation. The training sessions were held in a mock-up facility at the Pilcaniyeu plant. Inspectors received classroom training, used the measurement methods and IVASP software to calibrate instrumentation, performed quantitative measurements of process equipment and waste, located and quantified measurable deposits in process piping, performed enrichment measurements, and compared measurement results with operator declarations.

The successful completion of this complex task is a credit to the dedicated efforts of the many participants representing CITR, DOE, ARN, and IAEA.

Neutron calibration exercise at the Pilcaniyeu plant

HEU Transparency Implementation Program

In 1993, a contract was signed between the United States and the Russian Federation for the purchase of 500 metric tons of highly enriched uranium (HEU) from Russia at a cost of $12B over 20 years. The HEU will be down-blended in Russian facilities to reactor-grade low-enriched uranium (LEU) and delivered to the United States for fabrication into fuel for commercial reactors. The U.S. HEU Transparency Implementation Program was established so that the United States could monitor operations at the Russian facilities and ensure that the nonproliferation goals of the Purchase Agreement are met.

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Program operations occur at four sites in Russia:
(1) the Electrochemical Plant in Zelenogorsk,
(2) the Mayak Production Association in Ozyorsk,
(3) the Siberian Chemical Enterprise in Seversk, and
(4) the Ural Electrochemical Integrated Plant (UEIP) in Novouralsk.
At these four facilities, the United States will monitor the program by

- analyzing the declared data supplied by the Russian facilities,
- performing six special monitoring visits per year to each of the four facilities,
- maintaining a U.S. Department of Energy (DOE) Permanent Presence Office (PPO) at UEIP in Novouralsk, and
- using U.S. instrumentation to monitor materials and processes, including the Portable Nondestructive Analysis equipment and the Blend-Down Monitoring System (BDMS).

U.S. team at the entry portal for the Electrochemical Plant in Zelenogorsk during a special monitoring visit

During this year, the United States has conducted 10 special monitoring visits to the Russian processing facilities, with Oak Ridge personnel filling 18 positions on the monitoring teams. One Oak Ridge individual recently completed a 60-day assignment at the DOE PPO in Novouralsk.

Also, three technical meetings have been held in Moscow regarding the implementation of the BDMS equipment at UEIP. In these meetings, two Oak Ridge individuals have provided technical input for the negotiations between the United States and the Russian Federation.

Finally, Advanced Computing Technology in Oak Ridge has been working with Lawrence Livermore National Laboratory to develop a relational database for the Russian material control and accountability data that is subject to the Purchase Agreement. Phase I of the database was issued into a production mode in June.

Director's Note

This issue of our newsletter features two projects that represent the diversity of nonproliferation activities in which Oak Ridge and CITR are involved. The first article describes the Oak Ridge International Safeguards Group's involvement in the process to place an Argentinian enrichment facility under International Atomic Energy Agency safeguards, and the second article describes the HEU Transparency Implementation program as it monitors the implementation of the U.S.-Russian HEU Purchase Agreement, using technology application and a direct on-the-ground presence. As a result of that agreement, nuclear weapon material is being removed from the stockpile and is blended down into reactor fuel—truly a "swords-to-plowshares" activity.

— Larry Satkowiak

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